2019 Mosquito Season: MDAR/SRMCB Weekly Report

Epi Week 30 (July 21 – July 27) – Report #9 (8/2/2019)

This is the ninth Massachusetts mosquito report for the 2019 surveillance season.

This Week:

Epi Week 30 brought a major spike in EEEv activity, with 53 EEEv+ mosquito pools, all in Bristol and Plymouth Counties. This level of activity is now at the levels we had back 2012 (though that spike occurred one week sooner), the last time the state performed an aerial spray. Some of this spike is due to supplemental sampling being performed by both DPH as well as the Mosquito Control Projects in Bristol and Plymouth, so that we can better understand the extent of arbovirus activity in the southeast. Regardless, the Mean Infection Rate (MIR) for EEEv is now at 2.4 for the state as a whole (and even higher for Bristol and Plymouth Counties). Historically, we have not had an MIR this high and this early in the season since, again, 2012, and there is every indication that arbovirus activity is going to be steady, if not on the increase.

As a result, DPH has raised the risk levels of the following 10 municipalities to MEDIUM: Acushnet, Dartmouth, Fairhaven, Freetown, New Bedford (Bristol County), and Carver, Halifax, Lakeville, Middleborough, Plympton (Plymouth County). The state is closely monitoring the situation, and MDAR, the SRB, and DPH have been keeping in close contact. There were also 10 WNV+ pools. For the latest WNV and EEE risk maps from DPH, see www.mosquitoresults.com.

Cumulative Arbovirus-Positive Mosquito Pools Through Epi Week 30 (2015-2019):

2019	2018	2017	2016	2015			2012
12/3010 WNV (.4%) 57/3010 EEE (2%)	92/2816 WNV (3%) 0/2816 EEE (0%)	32/2222 WNV (1.4%) 0/2222 EEE (0%)	19/3555 WNV (.5%) 1/3555 EEE (.03%)	47/2203 WNV (2%) 0/2203 EEE (0%)			53/3079 WNV (2%) 80/3079 EEE (3%)

Mosquito pool submissions were up over Epi Week 29, again due mostly to supplemental trapping. Overall, *Coquillettidia perturbans* was once again the most common species collected, and made up the bulk of mosquitoes trapped this past week, though numbers were down about 25%, likely because this species has reached its peak in several parts of the state. We are also seeing very high levels of *Culex salinarius*, focused mainly in Bristol, Essex, and Plymouth Counties.

Weather:

Much of the state received significant rain during Epi Week 30, with upper southern Bristol and Plymouth Counties, the upper Cape, Franklin County, Middlesex and adjacent Worcester County all topping out at more than 3 inches of accumulation. A precipitation map is below, as is the Departure From Normal (DFN) map for the month of June, showing that the majority of the state was close to average rainfall for that month, though the extreme northeastern and southeastern parts of Massachusetts were more than an inch above average, and the southwestern part of the state was below average, explaining the former drought conditions that have since resolved. The July DFN map will be in next week's report, but we expect overall above-average precipitation for that month. We also know that July was officially the hottest month on record for at least the Boston area.

Questions/Comments? Contact: Jennifer Forman Orth, Environmental Biologist, Mass. Dept. of Agricultural Resources, jennifer.forman-orth@mass.gov or 617-626-1735

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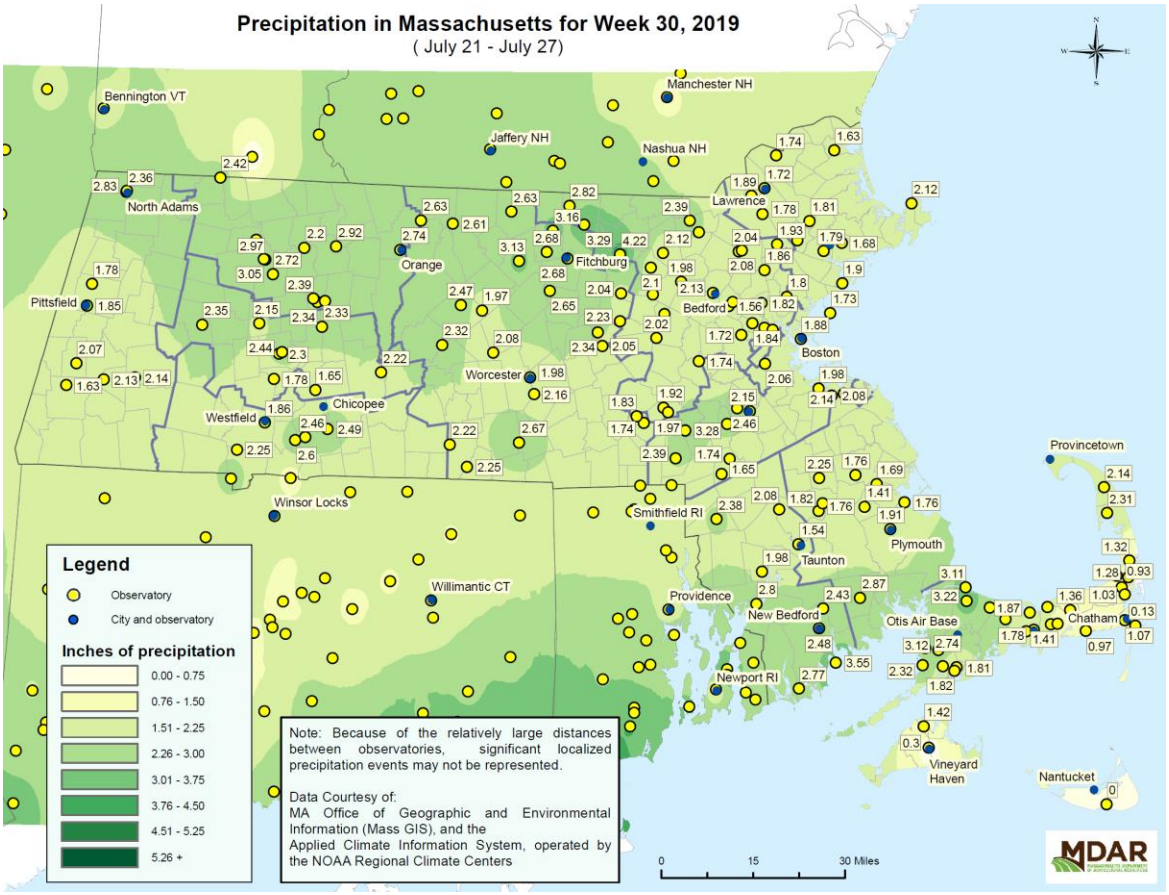

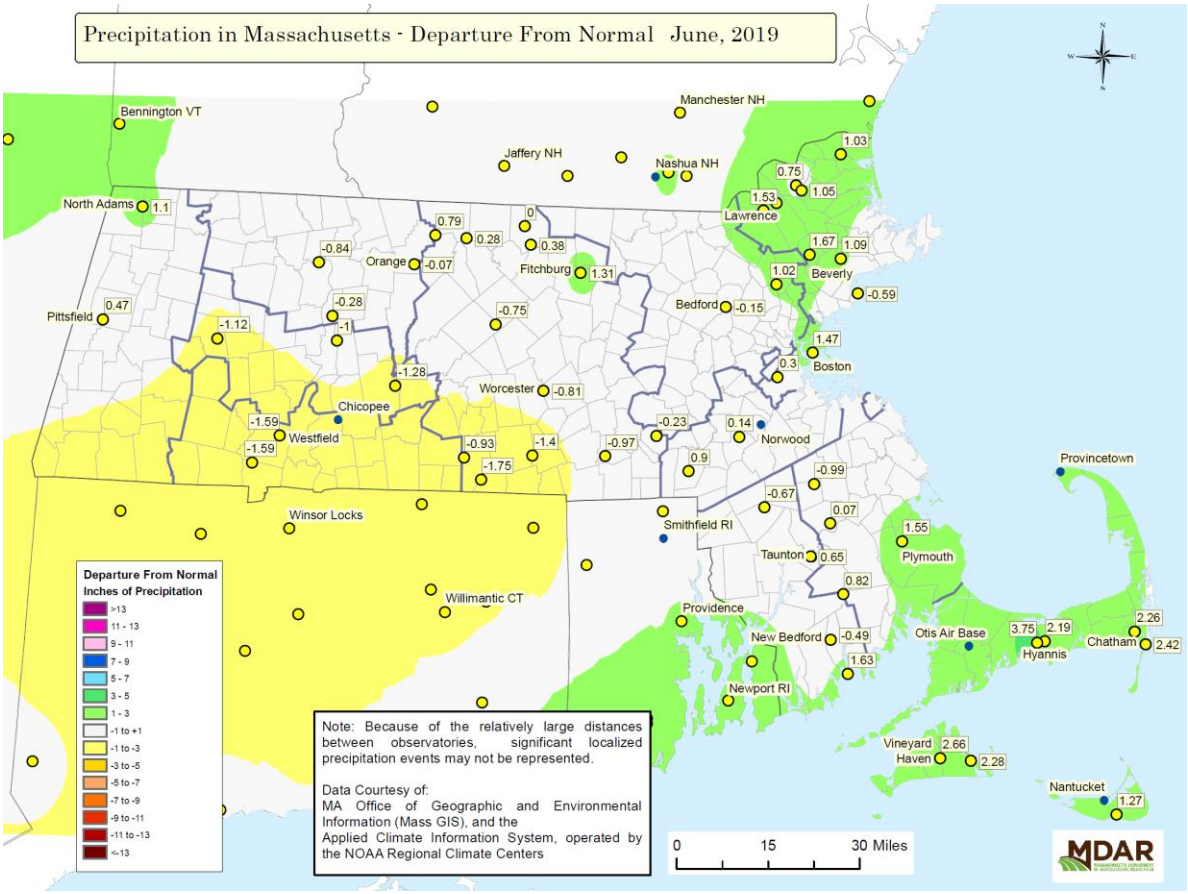

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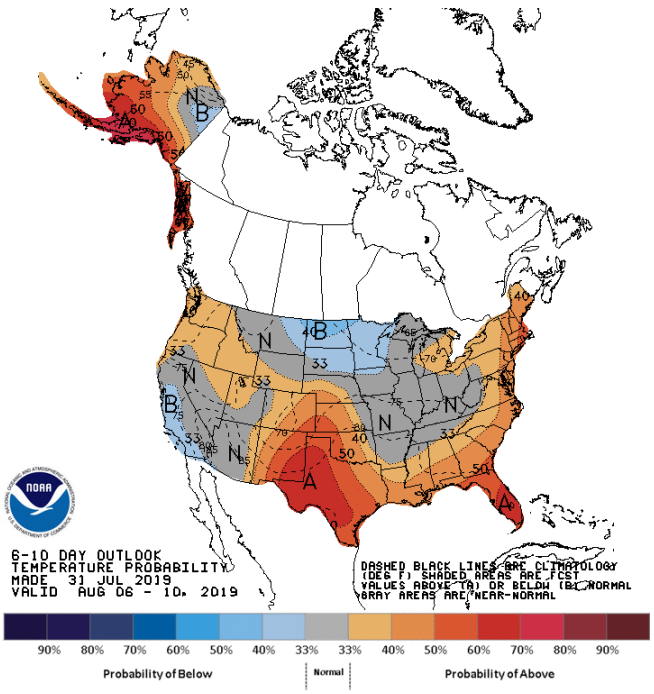
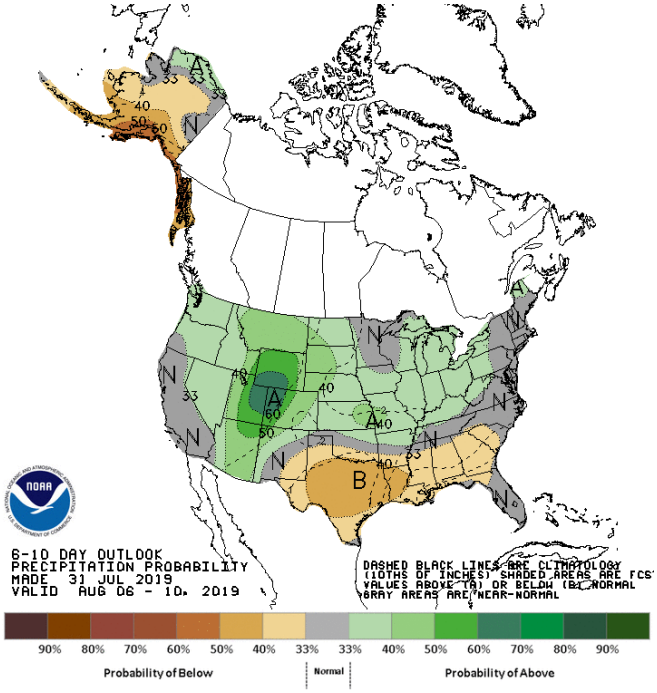
Looking ahead, temperatures for the first week of August are expected to be significantly warmer than normal with highs in the mid-upper 80s to low 90s. There are signs that the second half of August will have near or slightly below-average temperatures (more on that in the next report). There are also some signals that 2019 may have a much more active Tropical Storm/Hurricane season than anticipated, due to weakening El-Nino conditions.

Outlook maps for Epi Week 32 (8/3/2019 – 8/9/2019), indicating a strong chance of above-average temperatures, but only average precipitation, are below:

Temperature



Precipitation



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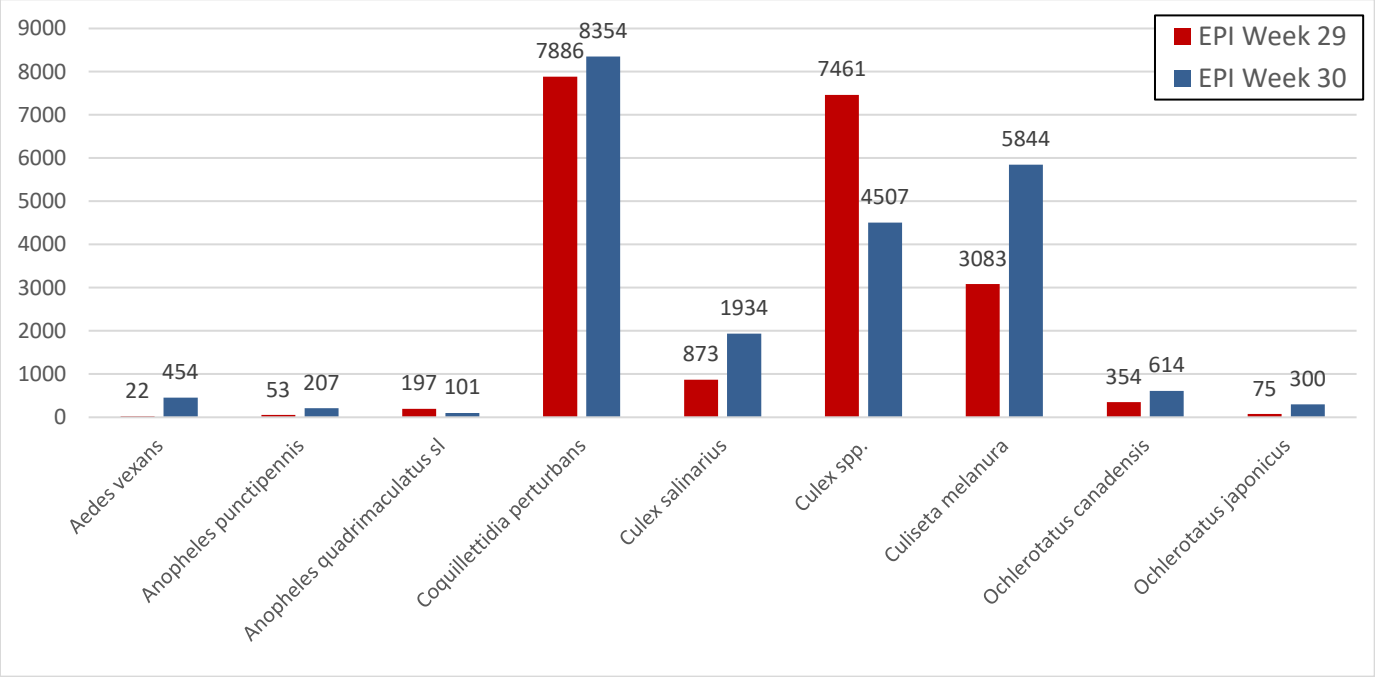
Mosquito diversity for Epi Week 30:

All mosquito pools submitted to DPH are tested for both WNV and EEEv. Submissions for key species were up this past week, except for *Culex pipiens/restuans*, with *Culiseta melanura* numbers almost double once again. The most common mosquito submitted for testing was *Coquillettidia perturbans*, followed by *Culiseta melanura*. These numbers are likely skewed by supplemental sampling occurring in Bristol and Plymouth Counties.



Detailed West Nile Virus Update:

- Mosquito pools testing positive for WNV (Epi Week **30**): 10 out of 629 pools tested (1.6%)
- Cumulative total of mosquito pools positive for WNV: 12 out of 3010 pools tested (0.4%)
- Minimum Infection Rate for WNV (Epi Week **30**): .4 (estimated number of infected mosquitoes per 1000 tested)
- Human/Animal Cases of WNV:
  - Horses: 0
  - Humans: 0
- Cities/towns where mosquito pools testing positive for WNV have been found this week:

# Pools	County	City/Town	Collection Date	Mosquito Species
2	Bristol	Easton	7/22/2019	*Culiseta melanura*
1	Plymouth	Carver	7/22/2019	*Culiseta melanura*
4	Plymouth	Halifax	7/22/2019	*Coquillettidia perturbans, Culiseta melanura*
1	Plymouth	Kingston	7/22/2019	*Culex pipiens/restuans*
1	Plymouth	Whitman	7/23/2019	*Culex pipiens/restuans*
1	Worcester	Worcester	7/26/2019	*Culex sp.*

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Detailed Eastern Equine Encephalitis Update:

- Mosquito pools testing positive for EEEv (Epi Week **30**): 53 out of 629 pools tested (8%)
- Cumulative total of mosquito pools positive for EEEv: 57 out of 3010 pools tested (2%)
- Minimum Infection Rate for EEEv (Epi Week **30**): 2.4
- Human/Animal Cases of EEEv:
    - Horses: 0
    - Humans: 0
- Cities/towns where mosquito pools testing positive for EEEv have been found this week:

# Pools	County	City/Town	Collection Date	Mosquito Species
1	Bristol	Dighton	7/23/2019	*Culiseta melanura*
5	Bristol	Easton	7/27/2019	*Coquillettidia perturbans* (2), *Culiseta melanura* (3)
2	Bristol	Freetown	7/23/2019	*Coquillettidia perturbans, Culiseta melanura*
13	Bristol	New Bedford	7/22/2019 (7), 7/26/2019 (3), 7/27/2019 (3)	*Aedes vexans, Coquillettidia perturbans* (3), *Culex salinarius, Culiseta melanura* (8)
4	Bristol	Raynham	7/27/2019	*Culex salinarius, Culiseta melanura* (3)
6	Bristol	Rehoboth	7/22/2019	*Culiseta melanura*
2	Plymouth	Bridgewater	7/23/2019	*Culiseta melanura*
6	Plymouth	Carver	7/22/2019 (3), 7/27/2019 (3)	*Coquillettidia perturbans* (2), *Culiseta melanura* (4)
4	Plymouth	Halifax	7/22/2019	*Coquillettidia perturbans* (2), *Culiseta melanura* (2)
4	Plymouth	Lakeville	7/22/2019 (1), 7/23/2019 (2), 7/26/2019 (1)	*Coquillettidia perturbans* (2), *Culex salinarius, Culiseta melanura*
3	Plymouth	Mattapoisett	7/23/2019 (2), 7/25/2019 (1)	*Coquillettidia perturbans, Culiseta melanura* (2)
3	Plymouth	Rochester	7/25/2019	*Coquillettidia perturbans, Culiseta melanura* (2)

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DPH EEEv Long-term Trap Summary:

- Abundance of *Culiseta melanura* collected at long-term trap sites for Epi Week 30 was down from Epi Week 29, but was still four times 2018 levels, and far above (more than 5 times) the 5- and 10-year averages.
- The predominant mosquito found at DPH long-term trap sites remained *Culiseta melanura*.
- The MIR for Culiseta melanura at these long-term trap sites was about 7.5 EEEv-infected mosquitoes out of every thousand.

Local Updates:

- Berkshire County: *Cq. perturbans* and *Cs. melanura* levels declined yet again this past week. *Culex* spp. remained the main mosquito in development, though populations are down compared to 2018. *Cq. perturbans* in the vicinity of *Cs. melanura* habitat continue to be targeted, and a recommendation for control was made in the vicinity of a WNV+ mosquito pool (Pittsfield).
- Bristol County: We are still in the middle of a record high population of *Cs. melanura*, and Epi Week 30 finally saw a huge emergence of *Cq. perturbans* as well, about two weeks past its historical peak. There were also high numbers of *Ae. vexans* in the southern part of the county. *Culex* spp. are trending somewhat low for this time of year. This past week's overall mosquito population ran about 3.5x above the 10-year average and 5x 2018 levels. *Cq. perturbans* finally surpassed 10-year averages for the first time this year, by 4.2x. *Cs. melanura* jumped up to about 9x higher than the 10-year average and 13x higher than the 5-year average. *Ae. vexans* was 12x higher than last year, while *Culex* spp. continued to be down by about half. Areas around *Cs. melanura* habitat and positive EEEv trap sites were treated with ULV adulticide. Treatment of Aedes albopictus habitats continued.
- Cape Cod: A series of three tornadoes touched down in Harwich, Yarmouth, and West Yarmouth on July 23, bringing down many trees and blocking access to some treatment sites and some traps. Crews reopened these sites. Some trees were uprooted and have accumulated rainwater at their bases, and we have already been finding mosquito larvae hatching in these new habitats. However, freshwater mosquito species levels decreased this past week, below 2018 levels but still above the 10-year average. The most abundant species were *Cq. perturbans* and *Cx. salinarius*. Levels of *Culex* spp. in gravid traps decreased again this past week, remaining below 2018 levels as well as the 10-year average. Crews have been treating catch basins and fresh and salt water habitats with larvicides and pupacide as needed.
- Central MA: *Aedes vexans*, *Cs. melanura*, and *Culex* spp. levels increased this past week, while *Cq. perturbans* and *Oc. canadensis* decreased. *Cq. perturbans* was once again the most abundant mosquito species, followed by *Culex* spp. Levels of *Cq. perturbans* were down 401%, suggesting that this species may have peaked for the season. All target species have been collected in higher numbers this year compared to 2018, except for *Culex* spp.
- Dukes County Mosquito Surveillance Program: No report was provided. Three pools were submitted, two *Oc. japonicus* and one of *Culex pipiens/restuans* No arbovirus was found.
- East Middlesex: Mosquito populations found in light traps continued to decline, due to *Cq. perturbans* levels continuing to fall falling and summer floodwater species at levels well below normal. Catch basin applications continued.

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- Norfolk County: Mosquito numbers decreased dramatically from last week, with large decreases in most species caught, except *Cx. salinarius*, which more than doubled in count from Epi Week 29. *Cq. perturbans* numbers decreased drastically at all sites except one, which exceeded numbers from previous years and had the highest number trapped in one night so far this season. Two trapping nights were affected by weather, so decreases may be due in part to heavy rains. *Cs. melanura* numbers decreased to less than a third of last week's catch.
- Northeast MA Mosquito & Wetland District: Mosquito collections for Epi Week 30 increased by 69% over Epi Week 29, due to increased abundance of *Cq. perturbans* (the predominant species) and *Cx. salinarius*. Collections were up 285% over 2018 levels, with *Cx. salinarius* levels much higher and *Aedes vexans* also high. Although the red maple swamps are quite dried back on the surface, *Cs. melanura* crypts are full of groundwater. This year we have seen peaks during Epi Week 26 and 30, and we expect another peak of this species between Epi Week 36 and 38. A salt marsh aerial larvicide is expected to be performed during Epi Week 32.
- Pioneer Valley: There were 41 mosquito pools submitted for testing in Franklin, Hampshire, and Hampden Counties, with the most commonly collected species now *Cq. perturbans*, followed closely by *Culex pipiens/restuans*.
- Plymouth County: Overall collections were down slightly over Epi Week 29, probably due to weather conditions, but were nearly twice what they are normally at this time of year. *Cq. perturbans* and *Cs. melanura* levels were twice what is typical for Epi Week 30, and *Cx. salinarius* was 4x normal. Trap average for *Ae. vexans* was 14 mosquitoes, up from less than 1 in the previous week, and are expected to continue to increase. *Cx. pipiens/restuans* collections were half what they normally are for this time of year.
- Suffolk County: Due to a large population of salt marsh mosquitoes (*Oc. sollicitans*), adulticide efforts took place in one Boston neighborhood. Light and gravid trapping continued, as did catch basin larviciding. The first round of catch basin applications in Boston will be completed during the first week of August.

Updates from other states:

- Connecticut: There were more than 27,000 mosquitoes tested during Epi Week 30, for a total of more than 133,000 tested so far this season. The first 3 WNV+ mosquito pools of the season were announced, though note they were collected during Epi Week 31. Four new JCV+ mosquito pools were found (from Epi Week 29), bringing the total for the season to 17 JCV+ mosquito pools. No other arbovirus has been found.
- Maine: With 187 pools tested so far this season, Maine reported no arbovirus found.
- New Hampshire: With 1021 mosquito pools tested so far this season, NH reported no arbovirus found.
- New Jersey: NJ reported 3 additional EEEv+ mosquito pools, for a total of 7 EEEv+ pools, with almost 80,000 mosquitoes tested. The state also announced their first equine case of EEEv of this season. NJ also reported an additional 8 WNV+ mosquito pools, bringing the total for the season to 17 mosquito pools and one human case of WNV, with more than 81,000 mosquitoes tested. No other arbovirus was found, leaving totals at 3 JCV+ pools and 1 LXV+ pool.
- New York: NY reported 49 new WNV+ mosquito pools and 2 new EEEv+ pools, for a total of 62 WNV+ mosquito pools and 4 EEEv+ pools so far this season. NY also reported its first human case for the season of the tick-borne illness known as Powassan Virus. Unfortunately, the case was fatal.

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- Pennsylvania: PA reported 8 new WNV+ mosquito pools, for a total of 21 through Epi Week 30.
- Rhode Island: As of Epi Week 30, no arbovirus has been found, with 7956 mosquitoes tested.
- Vermont: VT reported no arbovirus, with 1425 mosquito pools tested.
- Other arbovirus activity of note: South Carolina reporting a second equine case of EEEv. Florida is now reporting 83 EEEv+ sentinel birds and 25 EEEv+ horses, up from 79 birds last week.

Weather data provided by Trevor Battle; GIS mapping provided by Dake Henderson.

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